

## 8.4 /// EXERCISES

In Exercises 1–16, find the determinant of the matrix.

1.  $[5]$

2.  $[-8]$

3.  $\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$

4.  $\begin{bmatrix} -3 & 1 \\ 5 & 2 \end{bmatrix}$

5.  $\begin{bmatrix} 5 & 2 \\ -6 & 3 \end{bmatrix}$

6.  $\begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$

7.  $\begin{bmatrix} -7 & 6 \\ \frac{1}{2} & 3 \end{bmatrix}$

8.  $\begin{bmatrix} 4 & -3 \\ 0 & 0 \end{bmatrix}$

9.  $\begin{bmatrix} 2 & 6 \\ 0 & 3 \end{bmatrix}$

10.  $\begin{bmatrix} 2 & -3 \\ -6 & 9 \end{bmatrix}$

11.  $\begin{bmatrix} 2 & -1 & 0 \\ 4 & 2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$

12.  $\begin{bmatrix} -2 & 2 & 3 \\ 1 & -1 & 0 \\ 0 & 1 & 4 \end{bmatrix}$

13.  $\begin{bmatrix} 6 & 3 & -7 \\ 0 & 0 & 0 \\ 4 & -6 & 3 \end{bmatrix}$

14.  $\begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 0 \\ -2 & 0 & 3 \end{bmatrix}$

15.  $\begin{bmatrix} -1 & 2 & -5 \\ 0 & 3 & 4 \\ 0 & 0 & 3 \end{bmatrix}$

16.  $\begin{bmatrix} 1 & 0 & 0 \\ -4 & -1 & 0 \\ 5 & 1 & 5 \end{bmatrix}$

In Exercises 17–20, use the matrix capabilities of a graphing utility to find the determinant of the matrix.

17.  $\begin{bmatrix} 0.3 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 \\ -0.4 & 0.4 & 0.3 \end{bmatrix}$

18.  $\begin{bmatrix} 0.1 & 0.2 & 0.3 \\ -0.3 & 0.2 & 0.2 \\ 0.5 & 0.4 & 0.4 \end{bmatrix}$

19.  $\begin{bmatrix} 1 & 4 & -2 \\ 3 & 6 & -6 \\ -2 & 1 & 4 \end{bmatrix}$

20.  $\begin{bmatrix} 2 & 3 & 1 \\ 0 & 5 & -2 \\ 0 & 0 & -2 \end{bmatrix}$

In Exercises 21–24, find all eigenvalues and the eigenvectors of the matrix.

21.  $\begin{bmatrix} 3 & 4 \\ 2 & -5 \end{bmatrix}$

22.  $\begin{bmatrix} 11 & 0 \\ -3 & 2 \end{bmatrix}$

23.  $\begin{bmatrix} 3 & -2 & 8 \\ 3 & 2 & -6 \\ -1 & 3 & 6 \end{bmatrix}$

24.  $\begin{bmatrix} -2 & 9 & 4 \\ 7 & -6 & 0 \\ 6 & 7 & -6 \end{bmatrix}$

In Exercises 25–30, find the determinant of the matrix by the method of expansion by cofactors, expanding using the indicated row or column.

25.  $\begin{bmatrix} -3 & 2 & 1 \\ 4 & 5 & 6 \\ 2 & -3 & 1 \end{bmatrix}$

- (a) Row 1  
(b) Column 2

26.  $\begin{bmatrix} -3 & 4 & 2 \\ 6 & 3 & 1 \\ 4 & -7 & -8 \end{bmatrix}$

- (a) Row 2  
(b) Column 3

27.  $\begin{bmatrix} 5 & 0 & -3 \\ 0 & 12 & 4 \\ 1 & 6 & 3 \end{bmatrix}$

- (a) Row 2  
(b) Column 2

28.  $\begin{bmatrix} 10 & -5 & 5 \\ 30 & 0 & 10 \\ 0 & 10 & 1 \end{bmatrix}$

- (a) Row 3  
(b) Column 1

29.  $\begin{bmatrix} 6 & 0 & -3 & 5 \\ 4 & 13 & 6 & -8 \\ -1 & 0 & 7 & 4 \\ 8 & 6 & 0 & 2 \end{bmatrix}$

- (a) Row 2  
(b) Column 2

30.  $\begin{bmatrix} 10 & 8 & 3 & -7 \\ 4 & 0 & 5 & -6 \\ 0 & 3 & 2 & 7 \\ 1 & 0 & -3 & 2 \end{bmatrix}$

- (a) Row 3  
(b) Column 1

In Exercises 31–34, find the inverse of the matrix, expand by cofactors on the row or column that appears to make the computations easiest.

31.  $\begin{bmatrix} 1 & 4 & -2 \\ 3 & 2 & 0 \\ -1 & 4 & 3 \end{bmatrix}$

32.  $\begin{bmatrix} 2 & -1 & 3 \\ 1 & 4 & 4 \\ 1 & 0 & 2 \end{bmatrix}$

33.  $\begin{bmatrix} 2 & 4 & 6 \\ 0 & 3 & 1 \\ 0 & 0 & -5 \end{bmatrix}$

34.  $\begin{bmatrix} -3 & 0 & 0 \\ 7 & 11 & 0 \\ 1 & 2 & 2 \end{bmatrix}$